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SOURCE [redacted]

1. An electronic computer is under development at the Institute for Applied Mathematics of Dresden Technical University. Theoretical work on this computer started in 1949 under Professor Friedrich-Adolf Willers 1/, head of the Mathematics Department of the Technical University, and Professor Lehmann (fnu), one of Willers' pupils.

2. Prior to starting practical work, Professor Lehmann went to Goettingen and Hamburg Universities and became acquainted with the computers under development there. He procured documentary material on the Goettingen computer.

3. Willers and Lehmann at first planned to develop a relay machine. They intended to use so-called flat relays (Flachrelais) with ten poles as used in telephony. However, tests with a simple model of flat relay connections convinced the two men that such a machine would not work with the desired accuracy. It was therefore decided to construct an electronic computer for the solution of differential and integral equations. In 1951 Lehmann went to the Industrial Fair in West Berlin and studied an English computer exhibited there. During the same year, actual work on the Dresden machine was begun.

4. The development program consisted of two parts:

   a. Construction of a test model smaller in size than the completed machine.

   b. Construction of the complete machine after successful tests with the test model.

   The following parts of the test model are completed:

   1) The mains set (Netzgeraet), which is located in a small desk-shaped case. It contains the parts necessary for the generation of the operating voltage, such as transformers, rectifiers, filters and stabilizers. It also contains the measurement devices needed for the voltage control.

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2) The electronic rack. It is 1.9 meters high and 1.2 meters wide. It contains the tubes, amplifiers and relays. The rack of the test machine has a total of 250 electronic tubes, type RV 12 P 2000. The following are data on this type of tube:

Heat voltage - 12.6V (DC & AC)

Heat current - 0.075A

Anode voltage - 210V

Screen grid voltage - 75V

Grid voltage - minus 2.3V

Cathode resistance - 900 Ohms

Anode current - 2 mA

Screen grid current - 0.6 mA

Conductance - 1.5 mA-V

Magnification factor - 5.5%

Interior resistance - 1,000 kilo-Ohms

This tube was originally developed for the German armed forces and was mainly used by the German Air Force. After 1945 it was produced by the RFT Werk fuer Fernmeldewesen HF (formerly OSW) in Berlin-Oberschoeneweide. There are ample supplies of this kind of tube in East Germany. The Dresden machine is constructed in such a way that the tube type 6 SN 7 can also be used. This type, constructed on the model of an American model, is essentially the same as the RV 12 P 2000 type, but has different heating. In order to make the use of both types possible, the RV 12 P 2000 as used in the Dresden machine is provided with an adaptor.

3) The "memory" (Speicher). It serves the purpose of storing, withdrawing and cancelling intermediary results. The main parts of the "memory" are as follows:

a) A "slit disk" with a diameter of about 200 millimeters. This disk is made from Pertinax (a sort of hard bakelite paper) covered with a layer of magnetite. It is provided with 16 slits, each about ten millimeters wide, in radial arrangement. The "slit disk" rotates past 16 magnetophone heads, which are called impulse heads.

b) Another Pertinax-magnetite disk 200 millimeters in diameter, but not provided with slits, rotates around the same axis as the slit disk. This second disk rotates past 16 storing, reproducing and cancelling heads (Aufsprech , Wiedergabe- und Loeschkoepfe). The magnetophone heads are of small size, with a diameter of four millimeters.

c) The "slit disk" controls the "speaking", reading and storing of impulses upon or from the second disk. At present only one "slit disk" and one whole disk are completed. The final machine is scheduled to have a number of disks of both kinds so that storing of 128^{16} impulses will be possible.

4) The impulse generator. It consists of a toothed disk with 1,000 teeth, rotating with 3600 rpm past a magnetophone head. The disk of the test model consists of Pertinax with a magnetite layer. The completed machine is to have a toothed Calite disk.

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5. The completed machine will have the following parts:

a. The mains set.

b. Two electronic racks of 1.9 x 1.2 meters each; each has 250 electronic tubes of the above-mentioned type.

c. The memory.

d. The command device.

e. The tape recorder of Hollerith type (Lochkartenautomat).

f. The electric typewriter.

All parts of the completed machine assembled together will occupy a space of about three cubic meters. The primary current supply comes from a normal net of 220V or 3 x 380V with a net frequency of 50 cycles; the operating current is three kW. The total material costs of the completed machine (without development and personnel costs) are estimated at 150,000 DME.

6. The following is the way in which the completed machine is supposed to work:

a. The roblem is designed on a Hollerith card by hand. The design must contain all data and instructions necessary for the solution of the problem. That means that only trained mathematicians can do this part of the work.

b. The Hollerith card is put into the tape recorder, which converts the original data and instructions into holes according to the Hollerith method. The data are recorded in the dyadic system.

c. The tape is passed automatically into the command device of the machine.

d. The counting of the impulses is performed through flip-flop connections. The completed machine is scheduled to perform 70 operations per second.

e. The final result is carried over amplifiers to an electric typewriter which writes down the result in the decimal system. The automatic typewriter will be able to strike 15 keys per second. It is now under construction in the Rheinmetall firm in Zella-Mehlis.

7. Development and construction of the machine is being carried out by personnel of the Institute for Applied Mathematics of Dresden Technical University in a special laboratory of RFT Funkwerk, Dresden. Test problems which were fed by hand to the test machine were solved satisfactorily. The final machine with two electronic racks is to be completed by the end of 1954.

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1/ [redacted] Comment. During the war Willers was engaged in the development of command devices for the German armed forces.

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